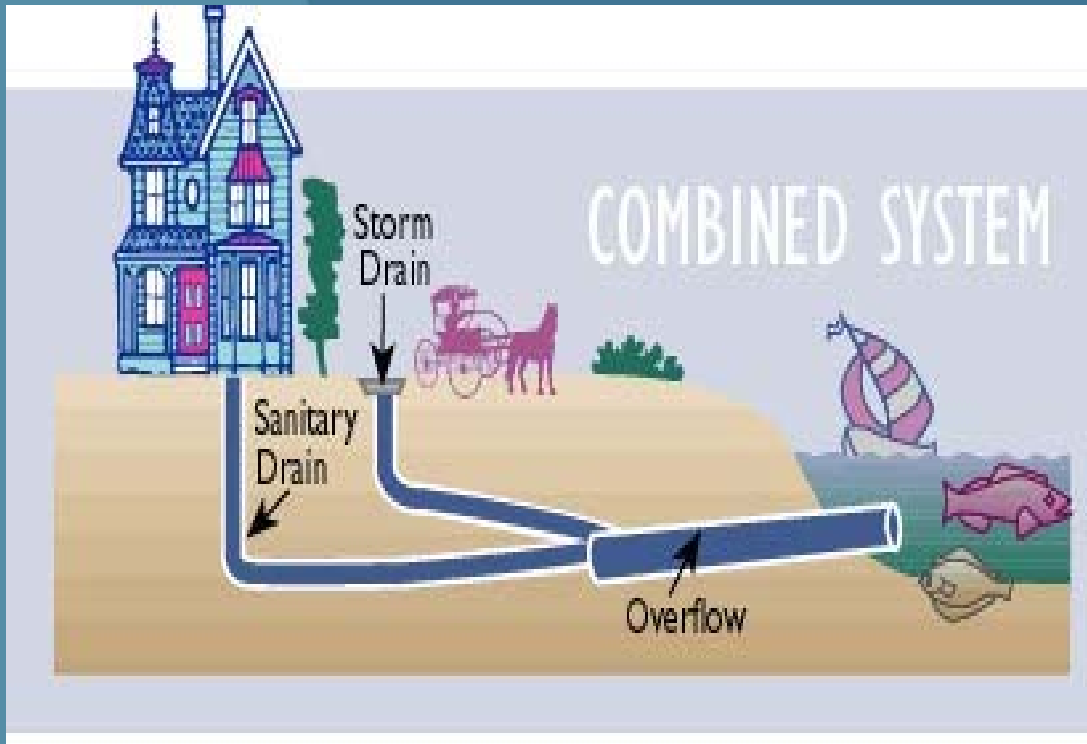


King County CSO Control Program Update

Presentation to
MWPAAC
Engineering & Planning Subcommittee
December 12, 2007

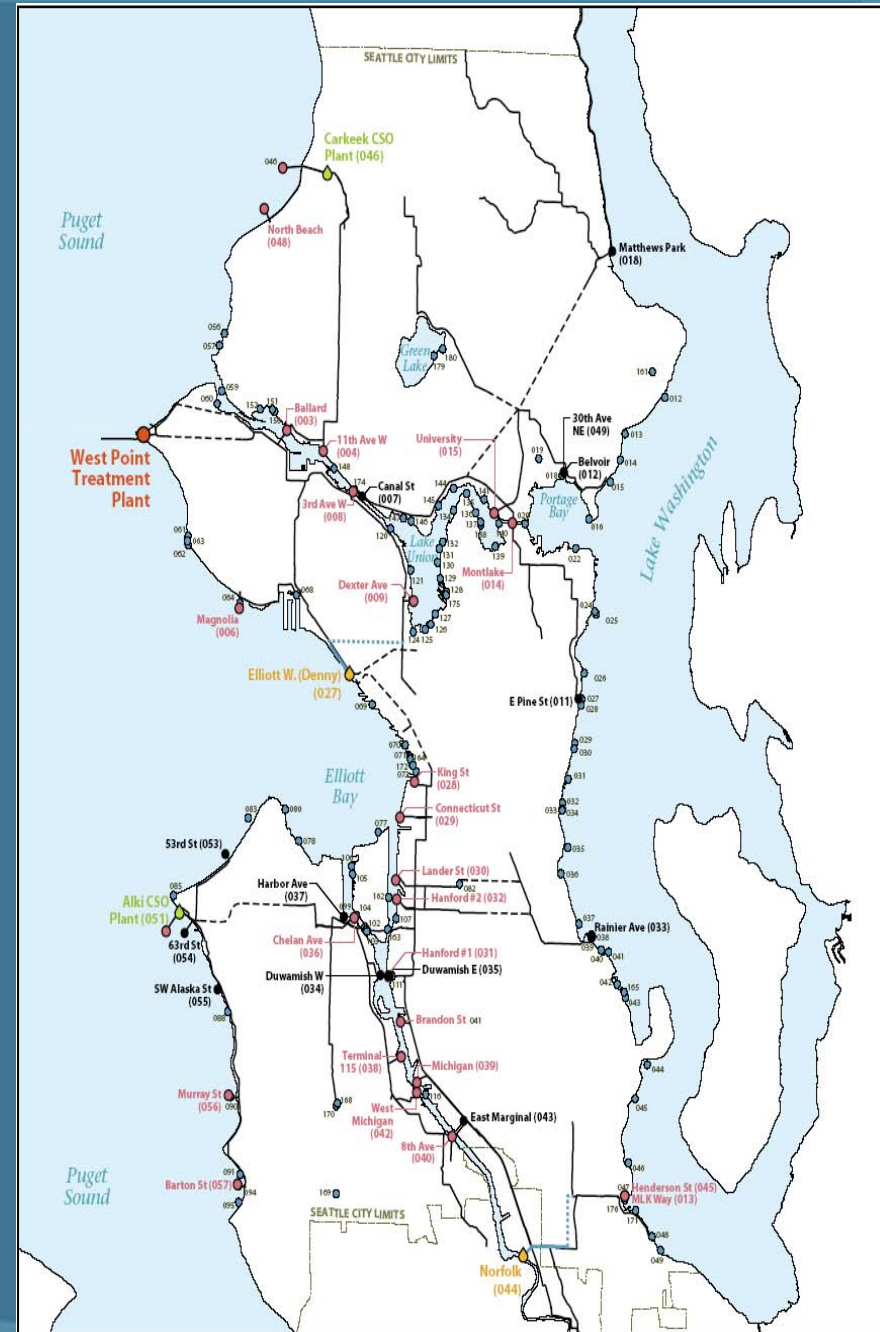
Why Were Combined Systems Built?



- “Managing Sewage” meant moving wastewater to nearest **waterway**
- Built when **horses** were main transport
- Manage sewage with horse manure and **stormwater**

Where are CSOs?

- Combined System exists **only within City of Seattle**
 - 20% of County system is combined
- **Both** agencies have responsibilities to manage CSOs
 - **Seattle** has 92 CSOs
 - **King County** has 38 CSOs



How has this Season Gone?

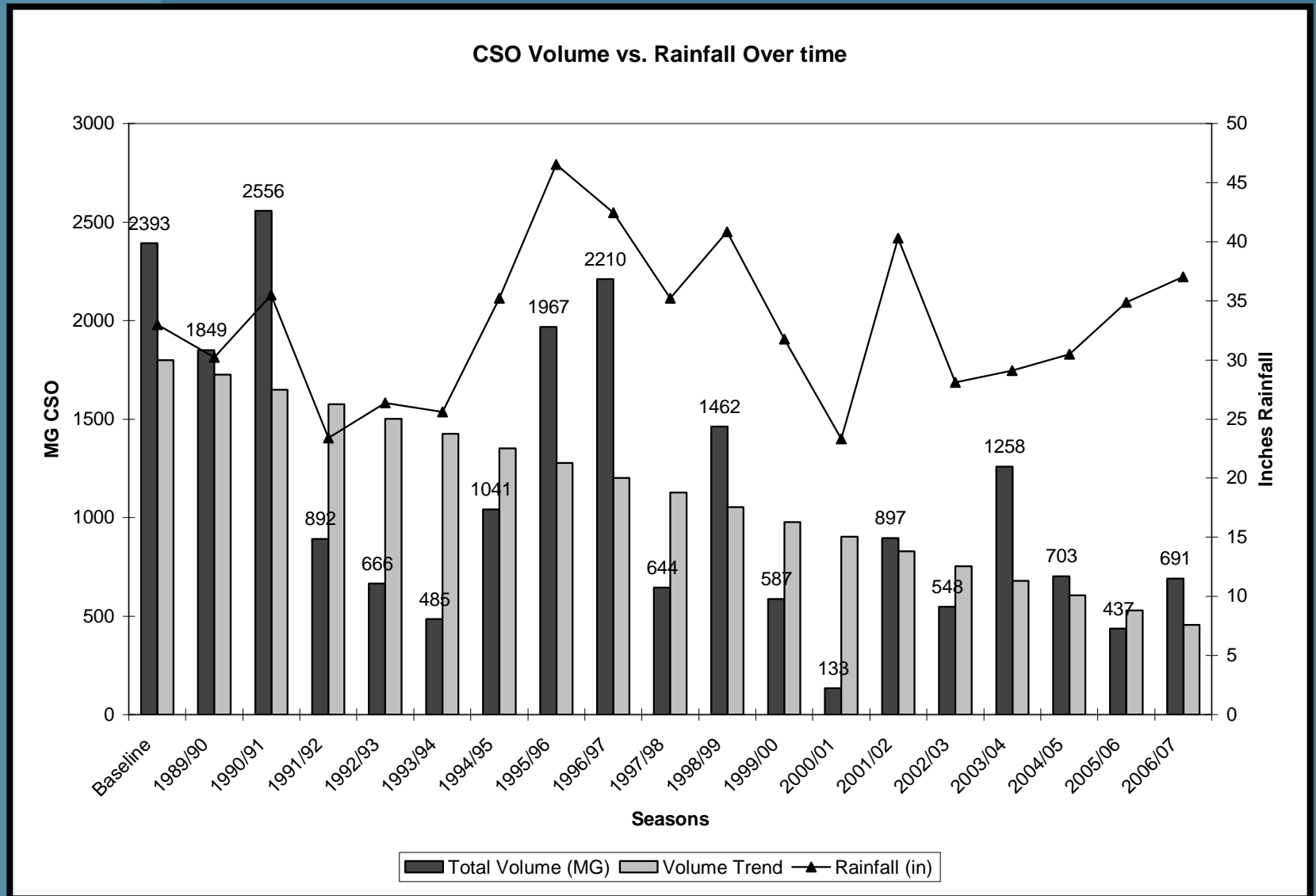
- Monday, December 3
 - Rainfall at Seatac 3.77 inches
 - West Division gauges 4.10 inches
 - West Point exceeded its maximum capacity (450 mgd)
 - Carkeek was flooded by Pipers Creek
 - Alki, Elliott West and Henderson/MLK all treating
 - South Plant at capacity (305 mgd)



2006-2007 Wet Season

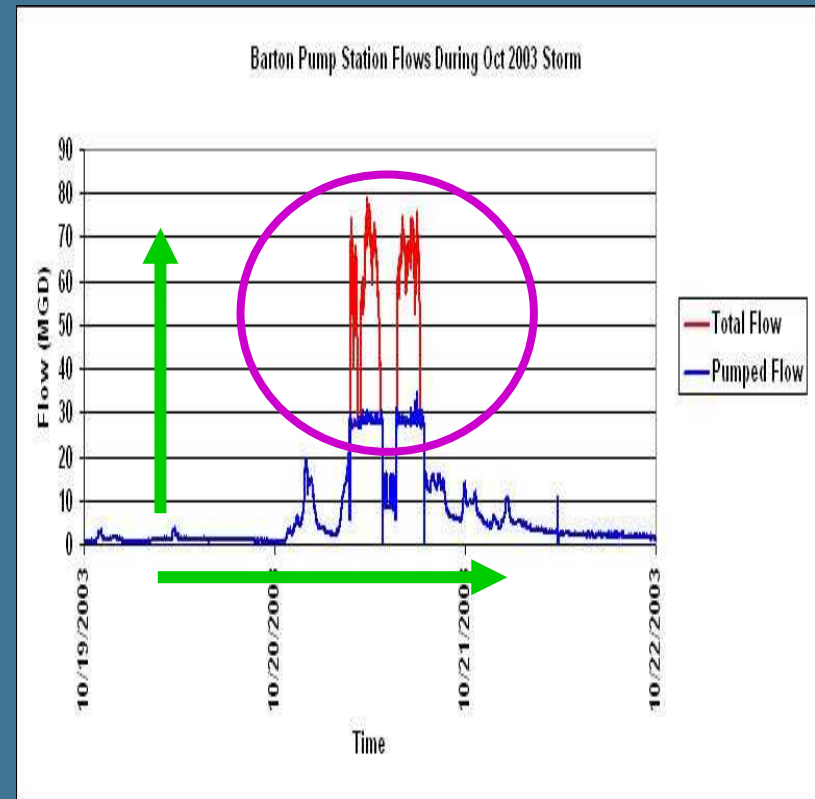
- Approximately one-third of the annual rainfall occurred during two storms
 - November (8.67 inches)
 - December (4.12 inches)
- Annual rainfall was 37.04 inches
- Over 55 percent of the CSOs occurred November and December
- Untreated CSO discharges of 691 MG
- 1983 baseline = 2.4 billion gallons

Annual CSO Volume vs Total Rainfall



Why Are Combined Systems a Challenge?

- Stormwater causes **large** fluctuations in volume
- This **Hydrograph** shows:
 - Flow **Volume**
 - Over **Time**
- The red lines show more flow than the pipeline can carry – it **overflows**
- This is what we must now control



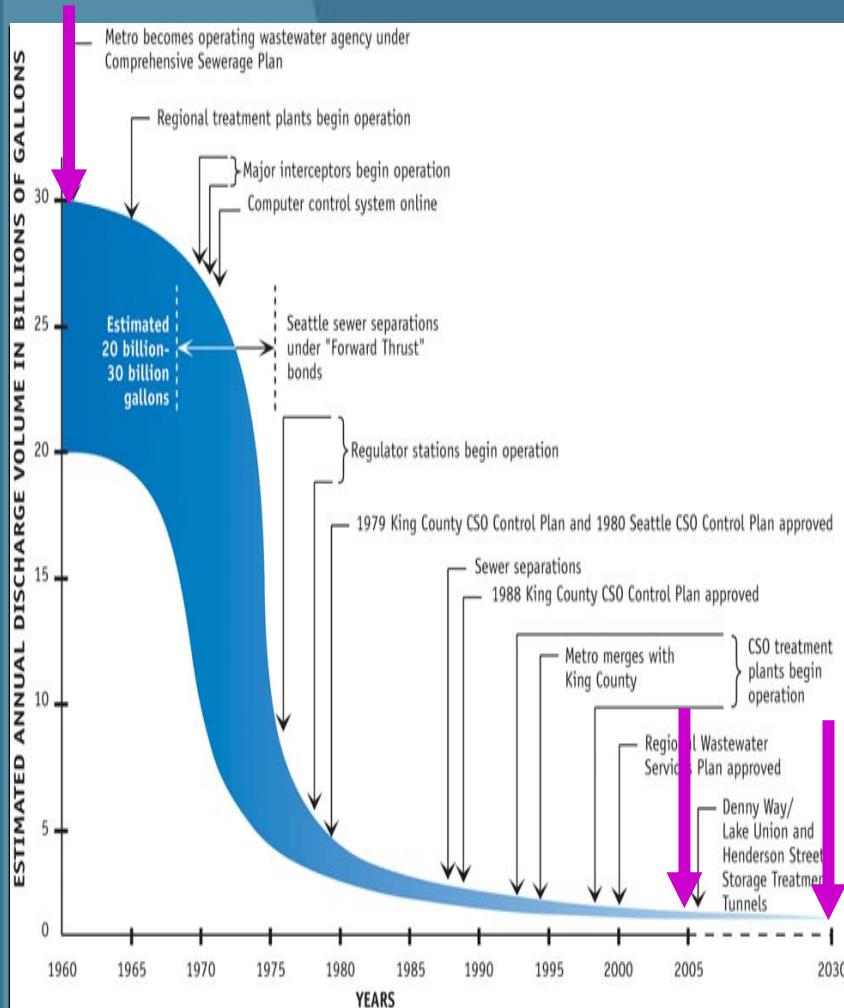
What is the CSO Control Target?

- State Ecology Regulations (WAC 173-245)
 - One untreated event per outfall per year over 5-year average
 - or CSO Treatment
 - 50% reduction of TSS
 - 0.3 mg/L/hr Settleable solids
 - Disinfection
 - Annual average
 - Meet water quality standards
- EPA Policy
 - Nine minimum controls

Tool Bag for CSO Control

- Controls available
 - Stormwater Control
 - Separation
 - Roof-leader Disconnection
 - Detention
 - Conveyance Improvements
 - Storage and Transfer to Secondary Plants
 - On-site Treatment
- Approach decided on project-by-project basis: most effective for least cost & least disruption

CSO Control Program



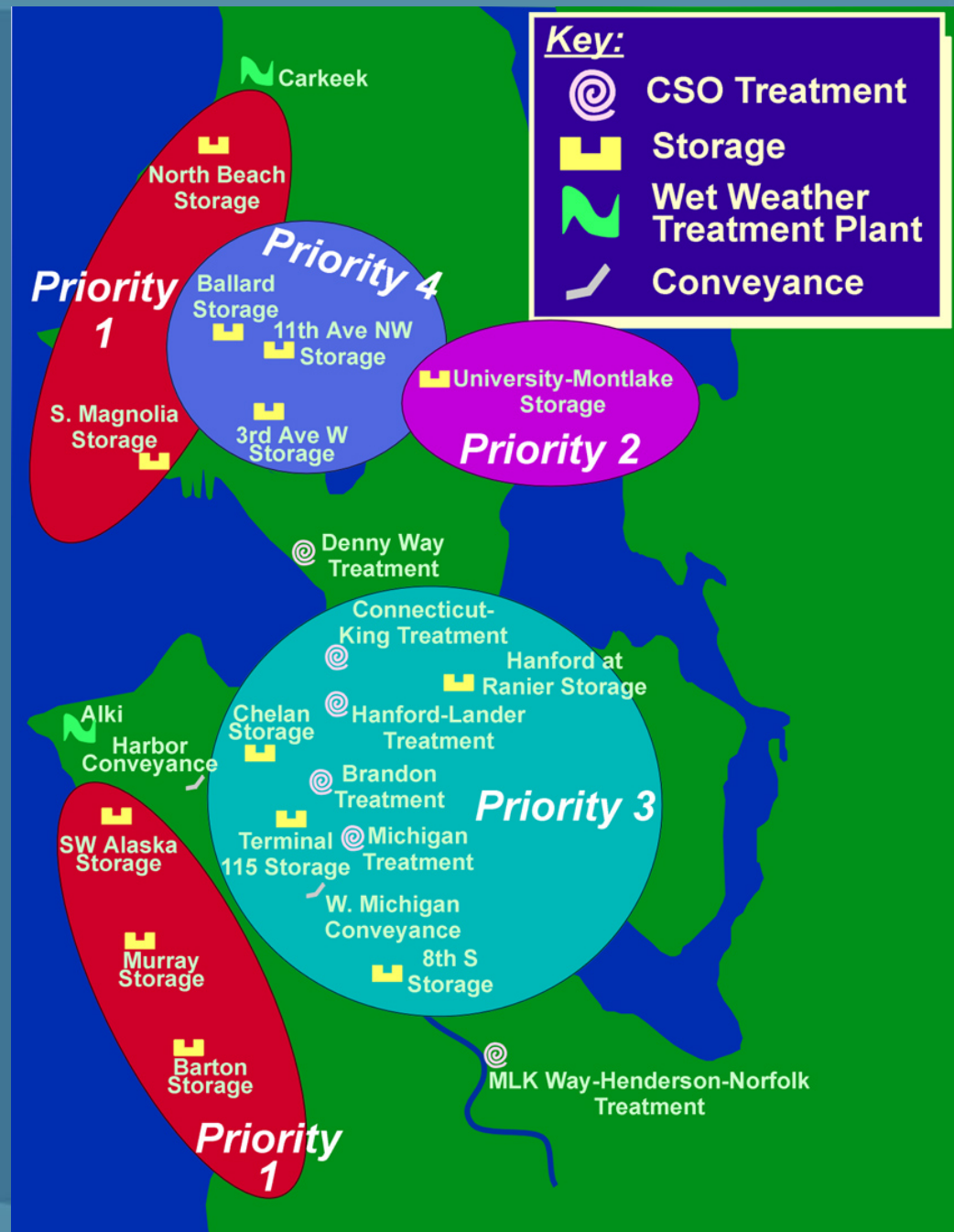
- In 1958 20-30 Billion gallons/y of wastewater released to waterways
- Reduced to 1.5 Bg/y by 2000
 - \$97M for completed projects
- Finished 2 large projects in Spring 2005
 - \$233M
- Beach projects next
 - Barton, Murray, Magnolia, North Beach
- Full system control (1 y) by 2030
 - \$378M

The Future: Regional Wastewater Services Plan

- Approved RWSP includes 21 CSO control project/concepts
 - Includes conveyance upgrades, storage, and treatment projects
 - All CSOs controlled to one event per year by 2030
 - Cost is \$378 million (2005\$)
- “Whole System” approach

Schedule set to protect public health, the environment, and endangered species

1. Puget Sound Beaches 2010-2012
2. East Ship Canal 2015
3. Duwamish 2017-2027
4. West Ship Canal 2029-2030



Pilot-Scale Testing of CSO Treatment Alternatives

- Objective: Investigate and test high-rate clarification technologies to assess feasibility for CSO Program implementation
 - Hydraulic loading rates
 - Effluent quality
 - Operability
 - Optimum chemical/polymer feed
 - Operating costs (chemicals)
 - Disinfection

Pilot-Scale Testing of CSO Treatment Alternatives

- Phase 1 – Project Development
- Phase 2 – Pilot-scale testing under controlled conditions (at West Point)
- Phase 3 – Pilot-scale testing under field conditions (offsite)

Pilot-Scale Testing of CSO Treatment Alternatives

- Schedule (approximate)
 - Phase 1 - complete Dec 2007
 - Phase 2 - Dec 2007 – Aug 2008
 - Phase 3 - Sept 2008 – May 2009

Sediment Management Program

- 7 CSO locations have contamination above state sediment standards
- 2 CSO sites cleaned up in Duwamish
- Denny Way site underway
- Continued monitoring at all site
- Working within 2 Superfunds

EPA Audit of CSO Program

- EPA initiated audit King County and City of Seattle programs in November 2007
 - Systematic national review efforts
 - Review 9 minimum controls
 - Recordkeeping and documentation
 - Schedule uncertain

9 Minimum Controls (NPDES permit)

1. Proper operation and regular maintenance programs
 - asset management programs
 - SCADA
 - Facilities inspection staff (CCTV, SONAR, visual, H₂S monitoring)
2. Maximum use of the collection system for storage
 - SCADA
 - Manage regulator stations to maximize flows
 - Store excess flows in large trunk sewers
3. Review/modification of pretreatment requirements to minimize CSO impacts
 - Industrial Waste Program
 - Monitoring and enforcement, education, and technical assistance
 - Fund the Local Hazardous Waste Management Program

9 Minimum Controls (NPDES permit)

4. Maximization of flow to the secondary plant
 - SCADA is used to maximize flow to West Point
 - Storage and transfer to the secondary and CSO treatment plants
5. Prohibition of dry weather CSOs
 - CSOs do not occur because of inadequate dry-weather flow capacity
 - Capacity to transfer 2.25 times average wet-weather flow
 - Overflows during dry weather result from power outages, mechanical failures, or human error.
6. Control of solid and floatable materials
 - Catch basin maintenance limits floatable materials to sewers
 - Overflow weirs in the system also hold back solids and floatables

9 Minimum Controls (NPDES permit)

7. Pollution prevention/contaminant reduction

- Industrial Waste Program
- Local Hazardous Waste Management Program
- Public educational materials

8. Public notification

- CSO Notification and Posting Program
- Web based Public Notification

9. Monitoring to effectively characterize CSO impacts and control project effectiveness

- Collecting overflow quality data for five CSO sites per year
- 1999 *CSO Water Quality Assessment*
- Sampling to meet Sediment Management Standards

Next Steps

- Hydraulic **model update** – 2009
- CSO **Plan update** to Ecology – 2008
- **Pilot** treatment technologies - 2009
- **Update project** descriptions, sizes & cost estimates for the 2010 program review
- **Executive recommendation** to Council – 2010
- **Participation** in Audit - 2008

For More Information Contact:

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King County WTD**

